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Facial Recognition based Attendance System

M R Padmapriya, Lakshmi S

Assistant Professor, Department of MCA, AMC Engineering College, Bengaluru, India

PG Student, Department of MCA, AMC Engineering College, Bengaluru, India

ABSTRACT: The face is the important feature of a human being since it may be helpful to uniquely identify a person. Facial characteristics may be used as biometrics in the construction of face recognition systems. The hardest task in every company is keep up of attendance. Under the traditional attendance method, teachers call out students, and their attendance or absence is noted. Conversely, the traditional methods are slow and time-consuming. This work suggests to acquire Open CV-based facial recognition method. As part of our assignment, we will take student photos, save them in a different folder, process those photos, and then record attendance on an Excel sheet. This model uses the faces of the approved students to train the system, the database which contains trained data is generated.

The cropped photos are then saved in a database with the appropriate labels. The Hear Cascade Feature extraction technique is useful to extract the features, and the LBPH algorithm is employed for recognizing faces. Attendance Monitoring Systems are required in all organizations to track student performance, and determining whether or not each student is present is not a straightforward procedure. Attendance is manually taken in all groups by phoning their registration numbers or names and recording in attendance. registers provided by department heads as proof, and in certain organizations, students prefer to sign these sheets, which are retained for future reference. Because few students frequently sign for missing students or notify proxy attendance of absent students, this practice is tedious and complex, resulting in mistakes. This technique also complicates tracking all students' attendance, making it impossible to monitor individual student attendance.

To overcome these issues, we propose using a face detection as well as identification framework used to automatically identify students and record their attendance by matching their faces to a stored database. This facial biometric system uses a camera to capture a person's image, compares it to the image stored during enrollment, and marks attendance if the two images match. In addition, artificial intelligence based techniques employed to track student attendance, such as taking motion photos of people in class and analyzing their presence over time.

I. INTRODUCTION

Attendance is a requirement for all organizations, but keeping a daily attendance register can be difficult and time-consuming. Several automated approaches, including biometrics, RFID, and eye Attendance is a requirement for all organizations,but keeping a daily attendance register can be difficult and time-consuming Several automated approaches, including biometrics, RFID, and eye attendance marking options include detection and speech recognition. This study proposes an efficient and intelligent solution to attendance tracking that takes advantage of facial recognition's accuracy and reliability. This solution solve the situations such as fraudulent attendance, expensive costs, and time consumption. It uses a face recognizer library to store facial recognition and attendance. The responsibility of this application is to improve existing attendance systems by include characteristics such as huge data storage, quick computing, and lower hardware costs.

The design entails creating an automatic attendance application that employs LBPH as a algorithm for face detection and HaarCascade as a facial recognition method. To correctly detect faces and register attendance, the system requires a video capture device as well as an algorithm. This eliminates the need for manual roll calls.

The system saves significant classroom time. Maintaining attendance records on a regular basis is a difficult chore, and the traditional approach of calling out each student's name is time-consuming and subject to proxy attendance. Our application adopt face recognition to keep track of student attendance. The system takes photos as the correct topic time arrives and uses face detection along with identification techniques to identify pupils. Recognized students are identified as present, and their attendance records are updated with the appropriate time and topic ID. Our project can identify and recognize any number of faces appear in real environment. The main thing is to create an automated student attendance application using face recognition algorithm. To achieve the best results, the test and training images are confined to frontal and upright facial photos with a single face. To maintain consistent quality, test and training

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photos should be recorded on the same device to perform further steps. In addition, students must register in the database to be recognized, and the user-friendly interface enables for on-the-spot enrollment.

II. LITERATURE SURVEY

In this research, S. Pss and M. Bhaskar [1] employ the Fast Adaptive Neural Network classifier (FANNC) for facial recognition, and each individual has a unique RFID card. However, if the RFID card cannot be identified by the RFID system, the system rejects the student's attendance to avoid deputy attendance. They constructed a database, known as an RFID-ROLL, that has 14 photos of each student, for a count of 2800 photographs, all of which are 640x480 color pixels. The system delicacy is above 79.29, which is lower than a CNN- grounded model, and that is the main disadvantage of this model, and this model is to test 40 thousand permutations of RFID cards.

Sajid and Associates[2] In this study, he created a model for associating persons when women wear headscarves and men wear beards. They employ the Original Double Algorithm (LBA) to discover faces. They employ fiduciary points to match the face. The system uses two databases. First, one recollection. The collection comprises previously stored prints, whereas the alternate database contains attendance data necessary to verify attendance. They use an image to record attendance, so they take one. They also eliminated the background and noise from the image, and using the Gabor technique, they indicated the 31 fiducially points that is used to calculate face traits. It will also match the database and track attendance. They take the photographs three times between courses to certify attendance.

Raghuwanshi et al. [3]. In this paper, they compare two point birth styles: PCA and LDA. They selected three characteristics for their comparison: Time stopped, Subspace Projection, and Accuracy based on an oral and classroom database. PCA is to reduce the amount of face recognition variables, whereas LDA is to minimize within-class smatter, which involves moving the same faces together. They employ two databases: the oral database, which has 400 photographs of 40 persons, and the class database, which contains 25 images of five individuals. They also include ROC and CMC graphs to help with database analysis and comparison. The ROC plot is utilized for the several possible cute spots of an individual test, whereas the CMC is employed to measure recognition performance. PCA and LDA operate effectively in typical lighting, with a distance from the camera of 1 to 3 bases and no disguise variation.

Winarno etal. [4]. In this research, they applied a three-position model sea corrupted star element analysis (WPCA) method for face identification. Originally, they captured photos of a person using two cameras on the left and right sides. After landing the image, they homogenize it. Normalization is done in two ways. The first is

Soniya et al. [5]. In this research, they suggested an IOT grounded system based on Adriano-UNO and a camera. They're setting up that system to create a pupil database, which means the stoner will be able to add a new entry, making it easier for druggies to register new druggies quickly. They use the PCA method for point detection and face recognition. They try to establish this point by having students leave the class in the middle, and if they do not return within 15 minutes, they are marked absent. They employ face shadowing and posture to recognize faces. They collaborated on a FMR (passed when genuine match reached) and FNMR (passed real stoner is blocked) graph. In this setup, they employ a 300k-pixel camera and light detectors to turn on four LEDs when it's dark. That camera's points include sharpness, image control, brilliance, and achromatize. The main disadvantage of this technique is that it takes time to record attendance because it only recognizes one student at a time.

III. SYSTEM ARCHITECTURE

The system architecture for our AI-powered attendance detection system. The system consists of two steps. The first step is the training phase, during which students' photos are recorded and their faces are identified using Haar features. The photos are then preprocessed, converted to grayscale, and saved in the dataset folder. The system uses these dataset photos to train the model with OpenCV, storing the generated model for later use. The second phase involves capturing real-time photos of students and detecting their faces using Haar characteristics. The collected photos are preprocessed to grayscale. The system then uses the LBPH technique to rectify the faces. If the identified faces match those of enrolled students, their attendance is reported as present; otherwise, absent.

The generated attendance data is retained in the system for future use. DATAFLOW DIAGRAM(DFD)
1.The Data Flow Diagram (DFD), commonly known as a bubble chart, is a graphical depiction of a application that shows the flow of input data, processing stages, and output data.

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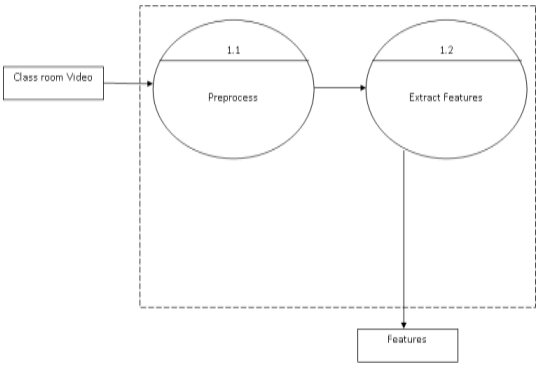
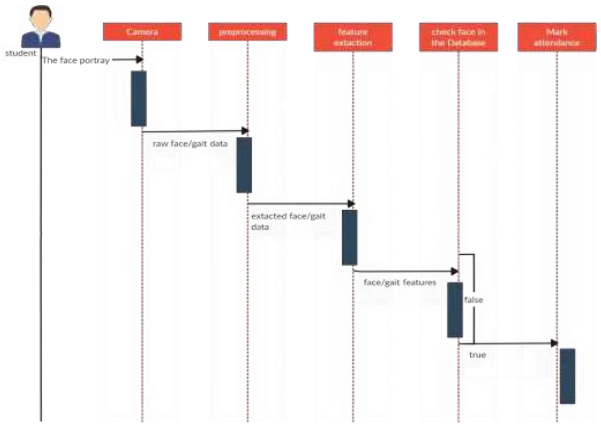
2.DFD is an important modeling method for representing system components such as system activities, the data involved in these processes, third parties that interact with the system, and information flows inside the system.



3.DFD demonstrates the spread of information and its modifications inside the system. It visually depicts the movement of data from input to output, emphasizing the points where changes or transformations take place.
4.DFD can be breakdown into layers that shows different levels of information flow and details. It allows you to portray the system at different degrees of abstraction.



Sequence diagram

EXISTING SYSTEM

In a traditional classroom setting, maintaining students' attendance is critical for analyzing their learning progress and monitoring characteristics such as discipline and engagement, which leads to more effective learning and higher success rates. Several methods for attendance management systems have been investigated, including fingerprint, RFID, iris, wireless, and facial recognition-based technologies. Face identification-based attendance management systems.

However, Manual attendance systems have several drawbacks:

- Manual errors can occur during attendance marking.
- It consumes a significant amount of time, particularly in large classrooms.
- Manual attendance systems can disrupt the learning process and waste valuableinstructional time.

PROPOSED SYSTEM

To handle these shortcomings, we suggest an approach that overcomes these constraints. Our proposed system attempts to automate the attendance process without students being aware of it, gives a seamless experience in a genuine classroom setting. This paper describes the suggested algorithm for the Student Attendance
This application contains five steps: enrollment, recording classroom photos, face detection and description, querying the database, and applying the matching algorithm.

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The advantages of our proposed systeminclude:
• Reduced time spent on attendance management.
• The attendance method is inconspicuous and does not impede learning.
•Low implementation complexity.
• Eliminated manual errors in attendance tracking.
Using these advantages, our suggested solution attempts to expedite attendance management and improve overall classroom productivity.

IV. METHODLOGY

Planning is the most critical aspect before starting any project, whether it is technical or non-technical. SDM describes the blueprint of the entire project and leading us through the sequence of processes that must be completed. It eliminates the confusion that arose in the middle of the project.

There are lots of methods followedby people but the popular and efficient oneis called Agile Model gives a solution for many modern-day problems. Traditional methods cannot be followed in big projected and hence it must rule out in software development projects. The Agile Model, which employs an iterative approach to software delivery, is now popular. Traditional approaches do not provide this attribute, making it difficult for developers to make changes after the final delivery. Agile, as the term implies, means moving swiftly, which is ideal for today's youth.

This strategy enables speedy resolution of the objectives demanded by both clients and industry specialists. Agile approaches also include requirements discovery and solution enhancement through collaborative efforts between self-organizing and cross-functional teams and their end users, as well as adaptable reactions to changes in requirements, capacity, and to known of the challenges to be solved. Its key twelve principles include customer satisfaction through early and continual release of valuable software, acceptance of changing requirements, frequent delivery of workable software, continuous attention to technical quality and good design, and many more. This project adheres to agile model principles by delivering the project on a frequent basis and making adjustments as needed. Interacting with mentors and soliciting suggestions from them.

V. EXPECTED OUTCOME

This project's goal is to create a robust and efficient automatic attendance application uses face recognition technology. The technology intends to automate the attendance marking process by taking photos of students, detecting their faces, and recognizing them, allowing attendance to be marked without manual intervention. Face identification is expected to be highly accurate, with complex algorithms to ensure a low number of false positives and negatives. The system should function in real time, marking attendance as students enter the classroom, and provide an easy-to-use interface for enrollment, attendance monitoring, and data management. this will allows on-the-spot enrollment and clear, accessible attendance records. By automating the process, the system is projected to drastically reduce the time and effort necessary to mark attendance when compared to previous techniques, preserving important class time.

Furthermore, the system seeks to increase the accuracy and reliability of attendance records by removing manual errors and proxy attendance. Efficient data storage and administration will make attendance records easy to retrieve for analysis and reporting. Overall, the system is projected to improve classroom productivity by providing a simple and inconspicuous approach for tracking attendance, allowing teachers to focus on instructional activities rather than administrative responsibilities.

VI. EXPERIMENTAL RESULT

Following implementation and testing, the face recognition-based automated application produced excellent results. The technology successfully collected photos of students as they entered the classroom and automatically noted their attendance, requiring no user involvement. Using LBPH algorithm and Haar Cascade for feature extraction, the system achieved excellent accuracy in recognizing registered students while minimizing false positives and negatives. Real-time processing ensured accurate attendance marking, fulfilling the project's deadline for fast and efficient recording. The designed interface was user-friendly, allowing for simple enrollment of new students, clear monitoring of attendance records, and effective data management.

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This automation greatly decreased the effort and time needed to record attendance when compared to previous techniques, saving valuable teaching time and decreasing administrative responsibilities. The solution increased the accuracy and reliability of attendance records by removing human errors and proxy attendance. Attendance records were efficiently kept in a database, making them immediately accessible for analysis and reporting, resulting in improved monitoring and management. Overall, the system improved classroom productivity by offering a simple and unobtrusive approach for tracking attendance, allowing teachers to focus more on instructional activities. The trial findings revealed that the system performed as intended, providing an effective, accurate, and user-friendly solution for attendance control.

VII. CONCLUSION

The Automated Attendance System was created with the intension of reducing the errors present with manual attendance systems. The goal is to automate and develop an application that can be acquired efficiently by organizations such as educational institutions. This technology replaces outmoded manual methods of documenting attendance in the office, making it more efficient and accurate. It provides security, dependability, and accessibility without requiring specific hardware for installation. The attendance system is built using a camera and a computer, allowing lecturers or teaching assistants to quickly track students' attendance during lectures, sections, or laboratory sessions. This automatic approach saves time and effort, especially in instances involving a high number of pupils. The image processing techniques in the classroom highlights the adaptability of this attendance system, which improves attendance along with boosts the institution's reputation.

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